APPENDIX B

DETERMINING CATALYST ADDITIVE ADDITION RATES

At least sixty (60) days prior to beginning each program to establish the optimized catalyst addition rate, MAP shall propose to EPA for its approval the catalyst additives MAP has selected for use. All catalyst additive weight percent addition rates in this Appendix shall be in terms of a 30-day rolling average and based on total catalyst addition rate. The maximum catalyst addition rate and incremental pick-up factor may need to be adjusted based on the performance of the EPA-approved catalyst additive compared to the performance of other commercially available catalyst additives. If additional time is necessary to determine the optimized catalyst addition rates, MAP may propose to EPA for its approval, a plan that modifies the process for addition of catalyst required by this Appendix and/or the schedules required by Paragraph 12. The baseline level of emissions for the $10,000/ton cost effectiveness threshold shall be based on the 3 calendar months of CEMS data immediately preceding the commencement of the establishment (and re-establishment) of the optimized catalyst addition rate.

I. Establishing Optimized Low-NOx CO Promoter Usage for the Robinson, Garyville, Texas City, Catlettsburg, Canton, Detroit and St. Paul FCCUs

A. The usage of conventional CO promoter shall be minimized at the typical mix of conventional CO promoter activities (i.e., based on historical usage), while retaining the basic effectiveness of CO promoter.

B. Usage of Low-NOx CO promoter shall replace usage of conventional CO promoter at the established minimized rate as normalized for different activities between the conventional CO promoter and Low-NOx CO promoter (as represented by the supplier) "Initial Addition Rate").

C. The effectiveness of Low-NOx CO promoter shall be evaluated to determine whether the following criteria are met:

1. Afterburn is controlled and regenerator temperature and CO levels are

adequately maintained;

2. Temperature excursions are brought under control adequately; and

3. A measurable NOx reduction occurs.

If the Low-NOx CO promoter cannot meet these criteria at the Initial Addition Rate, the addition rate shall be increased up to a maximum of two times the Initial Addition Rate. If at two times the Initial Addition Rate, the Low-NOx CO promoter fails to meet those criteria, the usage of the Low-NOx CO promoter may be discontinued.

II. Establishing Optimized NOx Reducing Catalyst Additive Addition Rates

Initial and maximum NOx Reducing Catalyst Additive addition rates shall be as follows:

A. For the Catlettsburg RCCU/FCCU (Unit 109), the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

B. For the Catlettsburg FCCU (Unit 1), if operated after June 30, 2004, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

C. For the Texas City FCCU, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

D. For the Garyville FCCU:

1. If a NOx Reducing System is installed pursuant to paragraph 12.A, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

2. If a NOx Reducing System is not installed pursuant to paragraph 12.A:

i. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, provided that MAP submits to EPA for its approval by February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data required by Paragraph 12.I for that same 30-day period; or

ii. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively, where the conditions in the above 2.i are not met,

E. For the Detroit FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, if a NOx Reducing System is installed pursuant to paragraph 12.A; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

F. For the Robinson FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, if a NOx Reducing System is installed pursuant to paragraph 12.A; or

2. the initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

G. For the Canton FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, provided that MAP submits for EPA approval by February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data required by Paragraph 12.I for that same 30-day period; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

H. For the St. Paul Park FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, provided that MAP submits for EPA approval by

February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data required by paragraph 12.I for that same 30-day period; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

To establish the optimized addition rate, NOx Reducing Catalyst Additive addition shall be increased at increments of at least 0.25 weight percent of total catalyst addition from the initial addition rate up to the maximum catalyst addition rate, and, once steady state has been achieved for each increment, the effect on NOx emissions and projected annualized cost shall be evaluated. If at any increment of NOx Reducing Catalyst Additive addition, the total annualized cost-effectiveness of the NOx Reducing Catalyst Additive used exceeds $10,000 per ton of NOx removed as measured from an uncontrolled baseline, or the incremental pick-up factor is less than 1.8 pounds of NOx removed level per pound of catalyst additive, the NOx Reducing Catalyst Additive addition rate used to determine the final emission limit shall remain at that level. The maximum catalyst addition rate and incremental pick-up factor is based on the best performing commercially available product. If lower activity products are used, the maximum catalyst additive addition rate and incremental pick-up factor shall be adjusted upwards based on the difference in activity between the product used and activity of the best performing commercially available catalyst additive.

IV. Establishing Optimized SO_2 Adsorbing Catalyst Additive Addition Rates for the Canton, Detroit and St. Paul FCCUs

Initial SO_2 Adsorbing Catalyst Additive addition rate shall be 5.0 weight percent of total catalyst addition rate. Once steady state has been achieved, the effect on SO_2 emissions of this rate shall be evaluated. To establish the optimized addition rate, the SO_2 Adsorbing Catalyst Additive addition shall be increased at increments of 1.0 weight percent of total catalyst additions up to a maximum 10.0 weight percent as determined below, and, once steady state has been achieved for each increment, the effect on SO_2 emissions and annual cost shall be evaluated. The maximum catalyst

addition rates and incremental pick-up factors are to be based on the best performing commercially available product. If lower activity products are used, the maximum catalyst additive addition rates and incremental pick-up factors shall be adjusted based on the difference in activity between the product used and activity of the best performing catalyst additive. The maximum optimized SO_2 catalyst additive addition rate shall be the lowest of the following addition rates expressed as a monthly average:

A. The addition rate at which the FCCU meets 25 ppmvd SO_2 (at 0% O2) on a 365-day rolling average and 50 ppmvd SO_2 (at 0% O2) on a 7-day rolling average basis in which case MAP shall agree to accept limits of 25 ppmvd SO_2 (at 0% O2) on a 365-day rolling average and 50 ppmvd SO_2 (at 0% O2) on a 7-day rolling average basis at the conclusion of the demonstration period;

B. The addition rate at which MAP demonstrates to EPA's satisfaction an incremental reduction of SO_2 of less than 2 pounds of SO_2 per pound of additive (the incremental pick-up factor), but in no event less than 5.0 % (by weight) of total catalyst addition rate; or

C. A maximum addition rate of 10.0 % by weight of total catalyst additions, except that if the addition of SO_2 adsorbing catalyst additive at this maximum rate limits the FCCU feedstock processing rate or conversion capability in a manner that cannot be reasonably compensated for by the adjustment of other parameters, the maximum addition rate shall be reduced to a level at which the additive no longer interferes with the FCCU processing or conversion rate; provided, however, that in no case, shall the maximum addition rate be less than 5.0 % (by weight).